

REMARKS

The Office Action dated December 4, 2008, has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

By this Response, claims 2, 11, 16-17, and 19 have been amended to more particularly point out and distinctly claim the subject matter of the present invention. No new matter has been added. Support for the above amendments is provided in the Specification, at least, on page 22, lines 15-25, and page 30, line 23, to page 31, line 15. Accordingly, claims 2, 8, 11, 13-14, and 16-19 are currently pending in the application, of which claims 2 and 11 are independent claims.

In view of the above amendments and the following remarks, Applicants respectfully request reconsideration and timely withdrawal of the pending rejections to the claims for the reasons discussed below.

Specification

The Office Action objected to the Abstract of the disclosure because of the use of legal phraseology. The Office Action further objected to the Abstract, stating that the language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure defined by this invention," and "The disclosure describes," etc. The Office Action objected to the Abstract of the disclosure because it exceeds 150 words in length.

Accordingly, Applicants have amended the Abstract of the disclosure to comply with the requirements of MPEP §608.01(b).

Therefore, Applicants respectfully request withdrawal of the objections to the Abstract of the disclosure, and respectfully submit that the Abstract is now in compliance with the requirements of MPEP §608.01(b).

Claim Rejections under 35 U.S.C. §102(b)/§103(a)

Claims 2, 8, and 16-19

The Office Action rejected claims 2, 8, and 16-19 under 35 U.S.C. §102(b) as being allegedly anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being allegedly unpatentable over Tahara, *et al.* (U.S. Patent No. 5,792,282) (“Tahara”). Applicants respectfully submit that the claims recite subject matter that is neither disclosed nor suggested in Tahara.

Claim 2, upon which claims 8 and 16-19 depend, recites a layered Fe-based alloy. The layered Fe-based alloy includes a coating disposed on an outer surface of a surface layer portion of the layered Fe-based alloy. The coating includes a carbide formed by carbonizing a first element that comprises a property to increase a hardness of the layered Fe-based alloy and a thickness of at least 0.5 mm. The layered Fe-based alloy also includes a second element including an amount that is greater at the surface layer portion than at an inside portion of the layered Fe-based alloy. An amount of the first element is greater at the inside portion than at the surface layer portion of the layered Fe-based

alloy. A hardness of the layered Fe-based alloy is greater at the inside portion than at the surface layer portion of the layered Fe-based alloy.

As noted in the Specification, at least, on page 19, line 25, to page 20, line 11, certain embodiments of the invention provide that a diffusion layer having a thickness of at least 0.5 mm (500 μm) improves the hardness and strength of a Fe-based alloy compared to conventional surface treatment techniques that have a diffusion layer thickness of only about several tens of μm to about 200 μm .

As will be discussed below, Tahara fails to disclose or suggest each and every element recited in claims 2, 8, and 16-19, and therefore fails to provide the advantages and the features discussed above.

Tahara is directed to a conventional surface treatment technique for carburizing austenitic stainless steel. Tahara describes a method of carburizing the austenitic stainless steel by holding the austenitic steel in a fluorine- or fluoride-containing gas atmosphere with heating prior to carburizing and carburizing the austenitic stainless steel at a temperature not more than 680°C. The austenitic stainless steel is stable and has 1 to 6 weight % molybdenum or 13 to 25 weight % chromium. The carburized hard layer has a corrosion resistance superior to a base material of the austenitic stainless steel (Tahara, Abstract; col. 2, lines 28-34).

Applicants respectfully submit that Tahara fails to disclose or suggest each and every element recited in claim 2. In particular, Tahara fails to disclose or suggest, at least, “a coating ... comprising a thickness of at least 0.5 mm,” as recited in claim 2

(emphasis added).

Rather, Tahara explicitly teaches that the surface layer is formed only to a depth of 5 to 70 μm (Tahara, col. 2, lines 57-64). Accordingly, Tahara fails to disclose or suggest, at least, “a coating ... comprising a thickness of at least 0.5 mm,” as recited in claim 2 (emphasis added).

Furthermore, Tahara fails to disclose or suggest, at least, “a coating disposed on an outer surface of a surface layer portion of the layered Fe-based alloy, the coating comprising a carbide formed by carbonizing a first element that comprises a property to increase a hardness of the layered Fe-based alloy,” as recited in claim 2 (emphasis added).

Rather, as noted in the Office Action, Tahara describes the penetration of carbon from a surface layer portion into an inside portion to form a deep uniform layer (Tahara, col. 6, lines 23-29). Thus, Tahara teaches away from the stainless steel including a member having a coating that exists on an outer surface of a surface layer portion of the stainless steel, as recited in claim 2.

In fact, Applicants submit that the Office Action failed to demonstrate that the description of Tahara even describes a coating that is disposed on outer surface of a surface layer portion of the layered Fe-based alloy, wherein the coating includes a carbide formed by carbonizing a first element that includes a property to increase a hardness of the layered Fe-based alloy, as recited in claim 2. Accordingly, Tahara fails to disclose or suggest each and every element recited in claim 2.

Claims 8 and 16-19 depend from claim 2. Accordingly, claims 8 and 16-19 should be allowable for at least their dependency upon an allowable base claim, and for the specific limitations recited therein.

Therefore, Applicants respectfully request withdrawal of the rejections of claims 2, 8, and 16-19 under 35 U.S.C. §102(b), or in the alternative, under 35 U.S.C. §103(a), and respectfully submit that claim 2, and the claims that depend therefrom, are now in condition for allowance.

Claims 2, 8, 11, 13-14, and 16-19

The Office Action rejected claims 2, 8, 11, 13-14, and 16-19 under 35 U.S.C. §102(b) as allegedly anticipated by, or in the alternative, as being allegedly unpatentable over Garg, *et al.* (U.S. Patent No. 5,777,247) (“Garg”). Applicants respectfully submit that the claims recite subject matter that is neither disclosed nor suggested in Garg.

The features of claims 2 were presented above. Claim 11, upon which claims 13-14 depend, recites a method for producing a layered Fe-based alloy having an increased hardness from a surface layer portion to an inside portion thereof, and further including a coating existing on an outer surface of said surface layer portion. The coating contains a thickness of at least 0.5 mm and a carbide formed by carbonizing a first element that has a property for increasing hardness of an Fe-based alloy. A second element, other than the first element, is contained in the Fe-based alloy. The second element has an amount which is larger in the surface layer portion as compared with the inside portion. An

amount of the first element increases from the surface layer portion to the inside portion. The method includes applying, to a surface of the Fe-based alloy, a powder made up of a substance which contains the second element. The method further includes heat-treating the Fe-based alloy with the powder applied thereto, so that the first element is diffused to the surface layer portion, and the first element reacts with carbon existing in the surface layer portion of the Fe-based alloy to form the carbide.

As discussed above, certain embodiments of the invention provide that a diffusion layer having a thickness of at least 0.5 mm (500 μm) improves the hardness and strength of a Fe-based alloy compared to conventional surface treatment techniques that have a diffusion layer thickness of only about several tens of μm to about 200 μm .

As will be discussed below, Garg fails to disclose or suggest each and every element recited in claims 2, 8, 11, 13-14, and 16-19, and therefore fails to provide advantages and the features discussed above.

Garg is directed to carbon steel powders and a method of manufacturing powder metal components using the carbon steel powders (Garg, col. 3, lines 9-32).

Applicants respectfully submit that Garg fails to disclose or suggest each and every element recited in claims 2 and 11. Claim 2, recites, in part, “a coating ... comprising a thickness of at least 0.5 mm,” (emphasis added). Claim 11 has similar limitations. The Office Action cited the protective layer of copper described in Garg to allege that Garg describes a diffusion layer. Amended claims 2 and 11 have replaced the “diffusion layer” with a “coating.” As previously described, amended claims 2 and 11

further recite that the coating has a thickness of at least 0.55 mm. Garg fails to disclose or suggest that the copper powder layer described in Garg has a specific thickness, and therefore fails to disclose or suggest each and every element recited in claims 2 and 11.

Furthermore, claim 11 recites, in part, “applying, to a surface of said Fe-based alloy, a powder made up of a substance which contains said second element; and heat-treating said Fe-based alloy with said powder applied thereto, so that said first element is diffused to said surface layer portion, and said first element reacts with carbon existing in said surface layer portion of said Fe-based alloy to form said carbide.”

Rather, Garg merely describes a sintered body obtained by sintering powder. Hence, Garg fails to disclose or suggest that a powder is applied to a steel material in order to form a diffusion layer on the steel material. Accordingly, Garg fails to disclose or suggest each and every element recited in claim 11.

Claims 8 and 16-19 depend from claim 2. Claims 13-14 depend from claim 11. Accordingly, claims 8, 13-14 and 16-19 should be allowable for at least their dependency upon an allowable base claim, and for the specific limitations recited therein.

Therefore, Applicants respectfully request withdrawal of the rejections of claims 2, 8, 11, 13-14, and 16-19 under 35 U.S.C. §102(b), or in the alternative, under 35 U.S.C. §103(a), and respectfully submit that claims 2 and 11, and the claims that depend therefrom, are now in condition for allowance.


CONCLUSION

In conclusion, Applicant respectfully submits that Tahara and Garg each fail to disclose or suggest each and every element recited in claims 2, 8, 11, 13-14, and 16-19. The distinctions previously noted are more than sufficient to render the claimed invention unanticipated and non-obvious. It is therefore respectfully requested that all of claims 2, 8, 11, 13-14, and 16-19 be allowed, and the present application be passed to issuance.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, Applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



Brad Y. Chin
Attorney for Applicants
Registration No. 52,738

Customer No. 32294
SQUIRE, SANDERS & DEMPSEY LLP
8000 Towers Crescent Drive, 14TH Floor
Vienna, Virginia 22182-6212
Telephone: 703-720-7800
Fax: 703-720-7802

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